CONTROL ARRANGEMENT FOR AN ILLUMINATING SYSTEM OF A MOTOR VEHICLE

The invention relates to a control arrangement for an illuminating system of a motor vehicle.

The illuminating system of a motor vehicle contains different light functions. Thus, lamps for the fog lights, the high beams, the driving beams as well as for the stopping and parking lights on the front side are provided, for example, in German Patent Document DE 43 41 058 C1. The lamps are in each case controlled by means of a microcomputer and by means of switching end phases connected thereto. It is problematic that an individual headlight (for example, a low beam or driving beam, high beam) can often not simultaneously meet different specific regulations (such as state-specific certification regulations) with respect to its basic optical setting. In some cases, different specific regulations might be met in that an optical reflector assigned to the headlight is always adjusted corresponding to the specific regulation. For example, in the case of headlights with separate reflectors for the driving light and the high beam, these reflectors can be adjusted individually in order to achieve the required illumination of the environment. In the case of headlights with a common reflector for the driving light and the high beam with a single two-filament bulb this is not possible, however. The same applies to separate reflectors

and illuminating devices when the reflectors are rigidly connected with one another. In all these cases, only one light function (for example, the driving light or the high beam) can then be correspondingly adapted to specific regulations. This disadvantage can be avoided in that a specific toolset is kept in each case for the specific regulations in order to produce specific reflectors. However, this is connected with high expenditures.

It is an object of the invention to adapt light functions of an illuminating system in a cost-effective manner to different specific requirements.

This object is achieved by means of the combination of characteristics of Claim 1.

According to the invention, a headlight range adjustment is used which often is present in the vehicle anyhow. A headlight range adjustment for vehicle headlights is known, for example, from German Patent Document DE 197 32 964 A1. Furthermore, according to the invention, the headlight range adjustment system is connected to a control unit. The control unit is designed such that it detects different light functions (such as low beams, high beams) as input signals and, as a function of the actually detected light function, controls an adjusting device of the headlight range adjustment for adjusting an illumination of the environment of the motor

vehicle. Such a control arrangement has the advantage that, by means of conventional technical devices, a required optical illumination of the environment of a motor vehicle can be achieved in a cost-effective manner.

For controlling the adjusting device, the control unit preferably uses at least one control signal, this at least one control signal representing a predetermined adjusting value of at least one physical quantity (for example, angle, path). This physical quantity can also be called an adjusting quantity.

An adjusting value of the same physical quantity can preferably be changed; that is, can be predetermined in different manners. This promotes a technically simple adaptation of light functions to different requirements. In this manner, for example, regulations for illuminating the surroundings can also be met without new components if these regulations change in the course of the operating time of the motor vehicle. In addition, the control arrangement can contain a type of "databank" which already contains predetermined adjusting values for different marginal conditions (such as state-specific regulations). As a function of the actual marginal condition, the "fitting" adjusting value can then be selected in the control arrangement and can, for example, be read out of a memory unit.

In order to be able to change the adjusting values as required, the adjusting values are filed, for example, in an inscribable memory unit or the like.

The memory unit or the like can be a component of the control unit.

In a preferred embodiment, the adjusting device adjusts an adjusting object, preferably a reflector for a headlight. In the case of a certain active light function, the adjusting object is in a basic position. As soon as another light function is activated, the adjusting object is changed into an adjusting position corresponding to the adjusting value or values predetermined for this light function. Preferably, several light functions are present to which different adjusting values or adjusting positions are assigned in each case. As soon as the original light function is activated again, the adjusting device changes the adjusting object back into the basic position.

This automatic adjusting can additionally be used for a manual headlight range adjustment. However, an elimination of the manual adjustment and an exclusive use of the automatic adjustment is also conceivable.

The preferred embodiments of the reflectors according to

Claims 6 and 7 can still be used in a cost-saving manner by means of the headlight range adjustment and the control unit, even if the light functions with respect to the illumination have to meet different requirements (for example, state-specific certification regulations). Changed reflectors and the tools required for this purpose are therefore superfluous.

The low beam and the high beam are preferably provided as different light functions. In an advantageous embodiment, the adjusting object is in the basic position when the low beam is activated. If the low beam is switched to the high beam during the driving operation, the control unit triggers the headlight adjusting range system and adjusts the adjusting object by a predetermined adjusting value or several predetermined adjusting values.

The physical quantity preferably is an angle of rotation. For example, a reflector, as an adjusting object, is adjusted by a predetermined angle of rotation.

The adjusting object can preferably be adjusted about several axes of rotation, so that the illumination system can still more flexibly be adapted to different regulations.

The invention will be explained in greater detail by means of the embodiment illustrated in the figures. The single figure is a schematic block diagram of the control

arrangement according to the invention.

By means of a rotary-type light switch, the driver of a motor vehicle can successively activate different light functions, for example, the low beam ABL (= driving beam).

By way of a line section 2, the rotary-type light switch 1 is connected to a control unit, which is not shown, here for controlling various lamps of the illuminating system of the motor vehicle. Furthermore, the rotary-type light switch 1 is connected by way of a signal line 3 (these may also be several lines) to an electronic control unit 4. In this case, an input signal is applied to a first control input 5 of the electronic control unit 4, which input signal corresponds to the light function activated by the rotary-type light switch 1. By means of an operating function at a steering gear arm 9, which is schematically illustrated in the figure, the high beam FL can be activated. An input signal, which corresponds to the condition of the light function which can be activated by the steering gear arm 9, is applied to a second control input 10 of the control unit 4. By means of a signal line 11 (these may also be several lines), the steering gear lever 9 is connected to the second control input 10. The control unit 4 detects the low beam ABL and high beam FL light functions as well as additional light functions. As a function of the detected active light function, an adjusting device 6 of a headlight range adjustment system is triggered by the control

unit 4. The triggering takes place by means of a control line 7 (these may also be several lines). Control signals, which cause the adjusting device 6 to adjust a reflector 8 of a headlight, are applied to the control line 7. For example, angles of rotation and/or axes of rotation defined for different light functions for a corresponding adjustment of the reflector 8 are filed in a memory of the control unit 4. Advantageously, these predetermined adjusting values can be adapted to requirements which have changed in the course of the operating time or change from one state to another, in that they are replaced by different predetermined adjusting values.

In a preferred embodiment, the triggering of the adjusting device 6 takes place as follows: In the basic position of the reflector 8 or of an assigned front headlight, the regulations for the illumination of the low beam ABL have been met. When a change-over now takes place in the driving operation from the low beam ABL to the high beam FL, the control unit 4 triggers the adjusting device 6 by means of control signals such that the reflector 8 is adjusted about a defined axis of rotation (for example, about a horizontal axis ah or a vertical axis av) along a predetermined angle of rotation W_{FL}. In this case, the adjusting values are defined such that the illumination of the high beam FL, in turn, corresponds to the regulations. When a switching back to the "low beam ABL" position takes place, the adjusting device 6 is

again triggered by the control unit 4 by means of corresponding output signals or predetermined adjusting values, so that the reflector 8 is returned into its basic position. The adjusting movement of the reflector 8, in turn, is a function of the horizontal axis of rotation ah and/or of the vertical axis of rotation av as well as of an angle of rotation W_{ABL} for the low beam.

If several axes of rotation are present, preferably first a horizontal adjustment of the reflector 8 about the horizontal axis ah takes place. If, in order to meet the regulations, a transverse adjustment of the reflector 8 about the vertical axis av of the vehicle is also required, in a second step, an adjustment of the reflector about this vertical axis av is also carried out in order to adjust the reflector 8 or the assigned headlight.

This method is preferably suitable for light functions or lighting devices where a common reflector 8 is assigned to the low beam ABL and the high beam FL or where the reflector for the low beam ABL and the reflector for the high beam FL are rigidly connected with one another.